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FACTORS HOSPITALS SHOULD TAKE INTO
ACCOUNT BEFORE SELECTING THEIR
LAUNDRY SERVICE

By
Peter Harry Christian

A THESIS

Presented to the Graduate Faculty
of Lehigh University
in Candidacy for the Degree of
Master of Science

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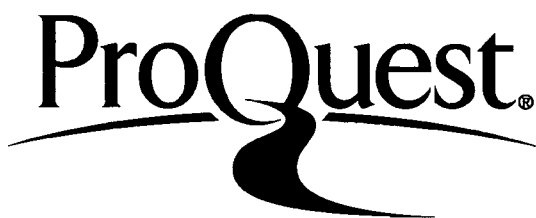
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Date 4/19/77

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Abstract

In recent years the importance of efficient and effective operation and maintenance of hospital services has become part of our social awareness. However, certain of these medical support services have still not achieved the necessary recognition they are due as essential parts of the health care system. One of the services in this situation is the hospital laundry service.

There are four(4) basic types of hospital laundry services which may be used to supply the daily needed amount of fresh linens to a particular institution. These four (4) services are: In house facility, Commercial service, Shared service, and Disposables. Before deciding upon which one (1) or combination of these services is best for any one (1) particular hospital, five (5) major areas of concern must be considered. These are: Administrative Control, Facilities, Personnel, Cost, and Quality. Under each of these areas are a number of individual criteria which must be fully studied and considered before any final selection of a service or services is made.

A survey of the literature concerning this aspect of hospital management failed to uncover any specific results concerning (1) administrative decision as to what rank order of importance should be placed on the five (5) areas men-

tioned and (2) whether those involved in the decision process give full consideration to all of the criteria listed, before a final service selection is made. The writer chose this topic since it was felt that any insight which could be supplied to this area was a worthwhile contribution to the management decision process.

Through use of the Critical Incident Technique in the conduction of the thesis survey, it was felt that generalizations could be made concerning the decision process of various hospitals. The scope of the study was limited to public and private hospitals of differing ownership, service type, and location. No attempt was made to study hospitals involved with municipalities or governmental agencies.

Six (6) hospitals were selected for this survey. Two (2) had just made recent service changes, one (1) had made a service change approximately twenty (20) years ago, and the other three (3) had never made or considered a service change at any time. All had some type of laundry manager overseeing their laundry system, regardless of whether the supplying service was in or out of house. Each manager was directly responsible to a particular hospital administration and was required to report directly to him. In only one (1) case was the service selection decision a non-administrative one.

The efforts of this investigation revealed several re-

sults that were indeed expected. The participants agreed on the ranking order of the five (5) areas of concern and by listing Quality as the number one (1) area, dispelled the hypothesis that the decision process was clearly an economic one. The results also showed that although full or nearly full consideration is given by approximately two-thirds ($2/3$) of the hospitals in general, the other one-third ($1/3$) seem to consider only 50% of the criteria necessary for making a good service selection.

Introduction

Despite the vast importance of a good hospital linen service, very little administrative attention has been paid to this subject, except for the writings and seminars of various laundry managers and consultants. Especially in today's society, hospitals must be concerned with various institutional costs and the quality afforded them by the service in question. It is important to ensure that the hospital will not be subject to lawsuits by dissatisfied and improperly cared for patients. [7] It is this writer's feelings that a fresh look at linen services through the eyes of an unbiased investigator will encourage administrators to look at their systems in a new and more critical light.

When a patient enters a hospital he must have a reasonable assurance that the care he will receive will help him on his way to recovery from whatever affliction he is hospitalized for. It is the institution's obligation to make sure that it provides that adequate care, while ensuring that the patient does not contract any complications during his stay (especially if the cause of the complication stems from improper hospital care). A seemingly trivial, yet actually important part of overall patient comfort and care is assurance by the hospital that the patient will receive fresh and clean linen at least once a day. Furthermore,

the surgical need for clean linen in the operating rooms must be available for supply immediately upon demand. Should these services not be properly carried out, the patient may be subjected not only to discomfort, but also possible infection from exposure to soiled linens.

There are various alternatives available to the hospital which may or may not provide the best linen service. These are:

Alternatives for Linen Service

I. In-house Facility

This type of service is completely controlled by the hospital concerned. Washing, sewing, and any special treatment of linens is done right on the premises with equipment owned by the institution. By having an in-house facility it is usually quite easy to track down any problems which develop within the system. For instance, if the linen cleanliness is not acceptable, or the supply of linens is not enough for a particular floor, the source of the problem may easily be located and corrected. With any other type of service, this problem may eventually be located and hopefully corrected, but the time element involved is quite prohibitive.

The in-house facility also allows for the wants of the hospital it serves to be of the highest priority, since it is in effect serving only that one institution.

With any other service many institutions are being served, thereby causing each hospital to wait its turn until time can be spent on its problem. Also, since outside laundries service various other industries such as restaurants and hotels, hospitals may find that the laundry will spend more time on these business' needs than on theirs. With the in-house service, no pressure will be exerted on the individual hospital to standardize many of its linen items in order to make it easier for the supplier to serve not only them, but all of his other clients as well.

Furthermore, by using its own facility, the administration is not tying itself into a long term contract where costs may rise to a level higher than originally anticipated. This may occur due to escalator clauses written into the contract [7]. The laundry manager is responsible for all costs involved in his operation and he must answer directly for any unit increase. Thus, the hospital can directly ascertain and attempt to stem the cause of rising costs. A commercial service can always fall back on the premise that a cost rise is not under their control and the hospital has little recourse except to pay, unless it wishes to attempt to break the contract or bring suit against the company to substantiate the need for a price rise.

Despite its advantages, the in-house facility does have some disadvantages with which it must cope. For

instance, much room is needed in order to set up and run this type of operation. The machines needed are quite bulky and require a good deal of space for proper operation. Furthermore, as the hospital's linen needs grow, it may become necessary to expand the size of the operation, which the hospital may not have the room, money, or desire to do.

The cost of obtaining the equipment necessary to run such an operation may be prohibitive to the hospital. If the equipment is already available, the cost of maintenance, replacement, and addition may not be feasible.

Finally, no matter how much space and money the hospital has, an in-house facility will not run successfully if the manager in charge is incompetent. This perhaps is the main factor which rules against the hospital deciding upon an in-house facility. A poor manager may not only allow costs to escalate, but he may also allow an inferior type of washed linen to be produced. A competent manager can run his laundry just as efficiently, effectively, and cost competitively as any commercial service available [21].

II. Commercial Service

A commercial service is an outside agency which 1) just cleans the hospital's soiled linens, or 2) not only cleans the linens, but also supplies and replaces them [8].

For this service, the hospital signs a contract with the agency. Thus, the burden of maintaining an in-house facility is taken off the hospital's shoulders. This type of service allows for the freeing up of room previously occupied by washing, drying, and ironing equipment. Furthermore, the hospital is no longer concerned with upkeep and replacement of equipment and expansion of present facilities as the linen demand grows.

Another problem alleviated by the use of a commercial service is that the hospital has their linen handled by people who really know the laundry business. Whereas previously the hospital laundry manager may have been inept at handling and running the in-house facility; this problem is relieved by using the experienced outside agency.

Furthermore, by using a large outside service, chances are that its economy of scale may be considerably less than that of using an in-house facility. Since the firm is handling many other institutions besides this particular one, overhead expenses are being absorbed by many clients, thereby reducing the overall cost to each individual one.

However, in reality the hospital may only initially encounter a cost savings after which time they may be subject to increased rates due to rising costs within the laundry firm. By being tied to a long term contract which has an escalator clause to cover such cost increases, the hospital may literally find itself at the mercy of the

commercial firm.

Perhaps the most dangerous aspect of this type of service is that the hospital gives up entire control of its linen service [10]. Mixups and delays in transporting the linens to the hospital may occur, resulting in critically low inventories, at times. Special rush demands will not be met by the desired time. Labor problems involving the laundry itself, or its truckers may cause the hospital to receive no linen supplies at all [7].

The most serious problem of all is that no one in the hospital really knows whether or not the linen received is really being washed and disinfected properly by the contracted firm. A fear expressed by certain in-house facility managers, who previously worked for commercial concerns, is that in order to turn a profit these businesses must take short cuts in their laundering processes. If this means cutting the wash cycle to one-half its proper time, or by using only 60% of the necessary amount of soap powder in the washing process, that is what is done. Since no real standard of cleanliness or sterility has been set by any hospital group, or even by the Federal Health Agency, there is no way of anyone outside the commercial firm knowing whether the product supplied is in fact acceptable for patient care usage.

III. Shared Service

This type of service also goes under the title of cooperative laundry. What happens is that a number of hospitals (usually within a close proximity of one another) band together and jointly run a laundry system which services each of the member institutions. Depending upon the amount of involvement of each member hospital, the commitment to the service may range from a yearly membership to a twenty-five (25) year contract with the association. What the members hope to achieve from this union is the best of both worlds; namely,

1. a large laundry system where absorption of fixed costs by a number of institutions will lower the overall cost to each individual institution.
2. a system whereby each individual hospital can maintain some form of control over the service being employed.

Ideally these 2 points should occur in this type of arrangement. Those members with long-term commitments to the cooperative usually form a board which controls the service and hears complaints about it from all participating members. Regularly scheduled meetings are held, at which grievances are aired and suggestions for service improvements are volunteered. Steps are then taken to make the needed changes.

By receiving enough participation from local and

closely surrounding communities, there tend to be enough members to evenly absorb the overhead costs, thereby allowing for fairly inexpensive linen service.

However, as mentioned previously, this is true only of the ideal situation. Although it is a fact that many shared services do in fact function adequately, there are indeed drawbacks to these ventures [3]. For instance, certain personnel originally charged by the hospital to it laundry service will remain on the payroll despite the fact that the linen is being sent out for cleaning. In spite of the fact that the workers may be reassigned to other departments such as housekeeping, the costs associated with maintaining them on the payroll must still be allocated to the linen service operation if in fact they are still performing linen service related functions [3].

No matter how democratic this system may seem, those hospitals with the largest share of responsibility for running the operation will in effect receive the best service from the cooperative. This would seem only reasonable since each hospital representative has the responsibility of looking out for his institution's best interests. Thus, various lesser participating hospitals may receive substandard service in the areas of linen transport, supply and quality as compared with the service received by long term members.

Another problem encountered by using this type of

service is that labor disputes may cause the hospital to seek out new linen supplies. Although 100% delivery is guaranteed despite labor on operational trouble, there have been instances as just recently occurred in the Philadelphia area where a strike of cooperative employees caused member hospitals to use commercial services for their short term linen supply [8].

Lastly, although control can be placed over the laundry operations in order to stem contamination of linens due to improper washing and sterilization, there still remains the problem of contamination in transit. The greater the amount of handling involved, the more likely a non-sterile product will be received. Furthermore, if a delivery truck makes more than one delivery stop, the possibility of cross contamination arises [8].

IV. Disposables

This service is relatively new and therefore is just beginning to make real inroads into the hospital linen market. What is involved here is the substitution for regular cloth linen of single-use, disposable paper ones. Although disposables have not yet made the fully desired impact it was hoped they would upon introduction to the market, disposables have virtually replaced cloth diapers and bed pads in hospitals all over the world [8].

The advent of disposables has brought about some new dimensions in the area of linen supply. It has been found

that in many cases there is less chance of cross infection among patients when disposables are used. This is due to the fact that:

- 1) disposables are used only once and then are thrown away.
- 2) they are wrapped in sanitary packages which are not opened until the contents are to be used.

Another advantage is that certain articles are quite expensive to launder because of shape, construction, etc. These articles are things such as face masks, arm and wrist restraints, and T binders [17]. It would therefore be economically feasible to use disposables rather than reusables in these cases.

Finally, certain linens made of paper have been found to be much softer and more comfortable than their cloth counterparts. Such is the case of diapers, which after a few washings may become stiff, scratchy, and irritating to the touch. This problem is circumvented by using single use, throwaway, paper diapers.

The problems encountered with using disposables however, tend to far outweigh their advantages. Although in some usage areas the cost of disposables is less than that of reusables, for the most part they are quite expensive to use. For instance, studies done by Mr. Fritz Field of Mt. Sinai Hospital in the area of disposable versus reusable, O. R. packs have shown that for every type of pack

used disposables were more expensive. The higher costs ranged from a 233% more expensive disposable towel pack to a 650% higher figure for a disposable rather than a reusable drape pack [17]. Further studies by Badner, Zelner, Merchant, and Laufman showed that a higher capital investment of 4% was needed for O.R. pack inventory when disposables instead of reusables were used [2].

In order to use disposables far more storage area is necessary for supply. This is due to the fact that a large volume of disposables must be kept on hand in order to allow for proper inventory supply. In many instances the room needed for inventory could house a full-sized in-house laundry facility.

Lastly, it seems quite unfeasible to use disposables for every linen need. Patients who have slept on paper sheets have complained of feeling uncomfortable. Various hospital administrators feel that patients will resent "sleeping on paper" if disposable sheets and blankets are used [8]. Further more, doctors are still not totally certain that cross-infection prevention is a result of the use of disposables. It has already been proven that if a disposable happens to become saturated by any alcohol based liquid, it becomes a sieve for the passage of bacteria. Thus, although disposables have been made waterproof, in order to insure that they will remain sanitary and prevent infection they must be made alcoholproof [17].

Thus, it is in the best interests of the hospital to make sure that their service is dependable and efficiently run [17]. When deciding upon which service to use, it may be that a clear cut economic choice is not available. There are in fact five (5) areas which a hospital should concern itself with when deciding upon which service is best for them [22]. These areas are: [6]

- 1) Administrative Control - what policy the hospital has as to the amount of control it wishes to exercise over this service.
- 2) Facilities - the physical restriction a hospital has pertaining to a) regional location, b) space available for machines, storage, etc., and c) equipment available for linen processing.
- 3) Personnel - whether the hospital has a qualified laundry manager capable of efficiently and effectively operating an in-house facility.
- 4) Cost - which service alternative will provide the most attractive cost picture to the hospital.
- 5) Quality - whether the various alternatives can provide the sterility, cleanliness, and supply of linen necessary for proper patient comfort and care.

After these five areas have been applied to one or all of the aforementioned alternatives, the hospital administrator should have a pretty good indication of which service is right for his institution. It should be noted that no one alternative is best for every hospital, but the particular circumstances involved should permit one service to become more desirable than the other alternatives [3].

with all the advancements that have been made in every aspect of medical treatment and care, one would expect that all concerned administrators would cover every conceivable angle in order to insure that their hospitals have the best service available to them. Whether this fact is currently true remains to be seen, but with the feeling of social awareness and responsibility which has become a part of every industry throughout the United States, it will be only a matter of time before each and every administrator will pay a great deal of attention to the less glamorous aspects of the health care industry, such as the hospital laundry system.

Purposes of Investigation

Following the premise that selection of the proper laundry service for any hospital is not nor should be solely an economic decision, this writer attempted to ascertain just what considerations were given to this problem by the administrators concerned. The overall intent of this research was to: 1) report whether full consideration was being given to each aspect of the problem before a final decision on which service to use was made and 2) use the criteria listed by the administrators and found in the literature to establish guidelines for use in future decisions in this area.

In order to achieve these results, specific attention was paid to answering the following questions:

1. What do various hospital administrators feel are the important criteria necessary for deciding which service alternative is best for their individual institutions?
2. Were the five (5) areas of concern, namely a) administrative control, b) facilities, c) personnel, d) cost and e) quality all listed as important criteria by each administrator involved? If not, for what reason(s) were they excluded?
3. Where there any new areas formed with the criteria

listed which were not covered in the literature used? If so, what were they?

4. Is there a consensus among the administrators polled as to what the important criteria to be considered are in making such a decision as to what services to use?

General Background

This section deals solely with the explanation of various techniques which were used in conducting this research. Applications of these techniques can be found in the General Procedure, Results, and Conclusion sections.

Critical Incident Technique

The critical incident technique consists of outlining procedures for collecting observed incidents which have a special significance to the problem at hand. In order to do so they must meet with predefined criteria initially set up by the researcher [13].

This technique is a basic approach to problem solving, since for many years people have been making observations of activities in order to obtain information needed in arriving at a solution. An incident is any observable human activity from which inferences and generalizations may be drawn concerning that activity.

The foundation of the procedures presently used in this technique can be traced to the studies of Sir Francis Walton done approximately 70 years ago. However, the studies in the Aviation Psychology Program of the United States Army Air Forces in World War II are the direct cause of the outgrowth of this technique in the past few years.

Some studies carried out in this program which made use of the technique were:

- a. Performance reports describing the reasons for bombing mission failures were collected. From these came the basis for a number of recommendations resulting in the improvement of Air Force selection and training procedures [13].
- b. The gathering of specific incidents described by combat veterans which resulted in a set of categories called the "critical requirements" of combat leadership. This enabled the United States Army Air Forces to better select and train their officers for combat leadership.

Other areas of study since that time have been made in the areas of business, medicine, and industry where critical requirements for positions of responsibility and problem solving are classified and defined.

Thus, the critical incident technique is essentially a means whereby important facts concerning a decision process are collected and sorted. The most important aspect of this technique is the objectivity of the observations reported. In order for an observation to be considered objective, an undefined number of observers must independently make the same reports. Therefore, the sample size is not critical to the critical incident tech-

nique, as long as after a number of observations have been recorded either 1) no new observations are reported or 2) three (3) or fewer new observations are reported per one hundred (100) recorded.

The five (5) main setps of the present procedure for using the critical incident technique are listed below. These steps may be altered to accommodate the type of study being done, but in general this procedure should be strictly adhered to.

Step 1: General Aims - In development of an area to be studied there must be some fundamental objective(s) which are to be attained. If not, then it will be impossible to a) collect the needed data and b) reach an effective conclusion, since not only will the researcher be confused as to his purpose for study, but the participants too will not clearly understand what the objectives are. They will therefore be unable to respond properly to the questions asked them.

What is called for here is formulation of a specific direction for the study to take. This direction is then conveyed to the participants in such a manner that there can be

no doubt as to what the aim of the study is. This achievement will be realized if the responses received seem to follow the general aims of the study. If not, a reevaluation and restatement of the purpose for study is in order.

Step 2: Plans and Specifications - In order to reinforce the general aims a plan of attack must be formulated which will enable the researcher to obtain that information necessary to fulfill his objectives. To achieve these ends, the researcher must first decide what activities he is going to use for his observations. Unless his selection is properly made, the data received will be useless.

After the proper selection of what to observe has been made, the problem becomes one of deciding what persons will be used to make the observations. Specifically, the people selected should not only have knowledge of the activities under consideration, but also some control over them.

Finally, the researcher must express his aims to the participants and then make sure that he is not dissuaded from following them. If he allows the participants to control the

data collecting process he will find that his aims will not be attained, because the data he receives will be misdirected and therefore unsatisfactory.

Step 3: Data Collection - This phase of the technique is greatly aided by the establishment of good plans and specifications. It is important for the attaining of good results, that the proper data be collected. If the participant is unsure of his answers, chances are that the data received will not be good. Each participant must be certain that the answers he gives are both accurate and well thought out. In order to achieve this goal, all questions presented by the researcher must be completely understood by each and every participant. Example answers may be offered for clarification purposes only and in no way should they suggest that any particular answers should be given. The researcher must be certain that these rules are adhered to in order to achieve optimal results from his study.

If the researcher feels that any of the responses offered are weak or misdirected, he must use his discretion in determining

whether or not to remove them from his data collection. If he decides to do so, he must be absolutely sure that he is in no way biasing the eventual results. The sources of the data received by the researcher must be kept in total anonymity. The reportee, now assured that his confidences are safe, will be more open and informative in his responses than if he were convinced anyone could find out that the answers were his.

Step 4: Analysis - This step is necessary for the summarization of the data collected, into a form which can effectively be used for practical purposes. This allows inferences to be drawn from the data compiled in order to compare the activity defined against various other similar activities.

To achieve the required order of the data for the results desired, three problems must be overcome. These are a) Frame of reference, b) Category formulation, and c) General behaviors. The frame of reference is important in establishing solutions to the other two (2) problems involved. The concern here is the determination of what results

are to be established through the data collected. Once this is done, the data can then be classified in order to achieve the results desired.

Category formulation is the placing of data into groups formed by the researcher. Skill and sophistication are required for this since group formulations tend to be a subjective rather than an objective process. Data is grouped according to frames of reference and the groups are then formally defined. Reclassification, redefinition, and creation of subcategories may be necessary before this activity is satisfactorily completed.

General behaviors is the determination of the most appropriate level of specificity--generality to use in reporting the data [13]. Practical consideration must be given to how specific or general the data group headings used should be. The more specific the headings, the greater the number of behaviors involved.

Step 5: Interpretation and Reporting - Even if the other four (4) steps listed were completely followed, trouble will arise if the data col-

lected are not interpreted correctly. The four (4) previous steps must be reviewed in order to see what biases may have arisen in the results found, due to them. If the data collected are not representative of the study being made, no results should be reported since they will be unfairly and illogically founded.

In order to avoid faulty inferences and generalizations, any limitations caused by either the technique procedures used, or the participants involved must be reported. Although it is important to point out these limitations, this should in no way detract from the integrity of the results achieved. No researcher should shirk the responsibility of giving his opinion on the degree of creditability attached to his findings.

Rank Testing

If one wishes to know whether there is any significant measure of agreement of rank ordering among a number of judges, some type of nonparametric test should be used in order to draw a conclusion. One method of achieving the results desired is the use of a test ratio known as the Coefficient of Concordance. This method differs from

the method from which it originates, the Spearman Rank Correlation Coefficient. Whereas Spearman is used for comparison of agreement between two (2) judges only, the Concordance Ratio can be used for the comparison of two (2) or more people [20].

Suppose there were m people being asked to evaluate and rank order n different things. A matrix would be set up where each thing to be ranked was placed at the head of a column and each ranker would be placed at the head of a row. The total number of ranks of each ranker (sum of each row) would be found by the formula $\frac{n(n+1)}{2}$ and the grand total of all ranks given by all the judges involved would be $m\frac{n(n+1)}{2}$. So, if there were seven (7) things to be ranked ($n=7$) and five (5) people ranking them ($m=5$), each person would give $\frac{7(8)}{2}$ or $1+2+3+4+5+6+7 = 28$ ranks and totally there would be $\frac{5(7)(8)}{2} = 140$ ranks given.

If the judges involved exerted no real discrimination in their ranking methods, each thing ranked (sum of each column) would be expected to receive $1/n$ th of the grand rank total. In the case given $140/7$ or 20 would be the number of ranks expected if this were true. Similarly, if there was perfect agreement as to which of the n things should be ranked first, second, etc. we would expect the rank totals to form the series $m, 2m, 3m, 4m, \dots, nm$ (though not necessarily in this order, where the first thing would

be ranked first, the second ranked second, etc.). If the judges were found to be in complete agreement, then a difference would be found between the expected rank totals $\frac{m(n+1)}{2}$ and the observed rank totals. The value, $S_{\max} = \frac{m^2(n^3-n)}{12}$, is the maximum possible sum of the squares of difference between the expected and the observed total rank values. Should there be only partial agreement among all of the judges, then the actual sum of the squares will be less than this amount. In order to measure the degree of agreement among the judges, the ratio $W = \frac{S}{S_{\max}} = \frac{\frac{S}{\frac{m^2(n^3-n)}{12}}}{\frac{12S}{m^2(n^3-n)}}$ is used, where S is the actual

sum of the squares of rank difference.

This ratio or coefficient is designed in such a way that it can vary from zero (0) indicating complete randomness, to one (1), signifying complete agreement. Usually the value obtained will fall somewhere in between these two (2) numbers. When that occurs, a determination must be made as to whether the value actually indicates that there is an agreement. If it is decided that it does, a check must be made to see if this occurrence has happened by chance only.

What is then done is to test W for significance using the Snedecor's F - distribution. The procedure for doing this is:

Step 1. The calculation of w has a continuity correction applied to it by

a) using the value $S-1$ in the numerator

b) increasing the denominator, $\frac{m^2(n^3-n)}{12}$, by 2.

The new W value is then calculated.

Step 2. Snedecor's $F = \frac{(m-1)W}{1-W}$ is then calculated and

the F tables are entered with:

a) A greater estimate of degrees of freedom

$$(n-1) - 2/m$$

b) A lesser estimate of degrees of freedom

$$(m-1) [(n-1) - 2/m]$$

Usually, the degrees of freedom calculated will not be whole numbers. If such is the case, the value of F will have to be interpolated. The test should be conducted at either the 5% level of significance, which is good, or the 1% level, which is even better.

If it is established that there is in fact a significant agreement among the judges, an estimate of the "true ranking," based on the combined rankings of the judges can then be made.

General Procedure

Questionnaire Development

The data necessary for the development of this research were acquired through the use of the questionnaire located in Appendix I. The intent of this thesis was to find out what criteria were important to hospital administrators involved in the decision process of which laundry service to use in their institution. Thus, the questionnaire had to be designed in such a way that it would not influence any of the answers they gave. Instead, it had to allow those queried to freely and openly express their views, while at the same time keeping the responses directed toward the topic at hand.

Questions 1 - 9 and 11 were used solely to obtain general information concerning each particular institution surveyed. Although questions 1 and 2 asked for the name and location of the hospital involved, this information was used only for identification purposes in the writing of the thesis. In publishing the hospitals' responses, code letters were used in place of the institution's names and a designation of large, medium or small city area was used for the location. This allowed each participating institution to remain completely anonymous.

Questions 10 and 12 - 18 were the queries from which

the essential information on the decision criteria considered was obtained. These questions were written and presented in such a way as example answers to the participants as a means of clarifying the type of response desired. In no way did they try to suggest that any of these answers should be given as answers. In this way, a true representation of the administrators' approaches to the decision process could be obtained.

There was no trial testing of the questionnaire before it was actually employed as a data collection device. Since the questionnaire was to be used in conjunction with an interview of each participating administrator, it was felt that any uncertainties which might arise in the participants' minds due to any unclearly worded questions, would be cleared up during the course of the discussion. Therefore, control of the situation could be maintained, since there was no chance that any non-topical data would be collected during the survey.

Survey Design

There are three (3) areas of difference among the various hospitals selected for this study. The survey was designed in such a way that these three (3) areas were fully covered by the participating hospitals in order to compare hospitals with different backgrounds against one another. These areas of difference were:

1. Hospital Ownership - The two (2) basic types of ownership with which this study was concerned were the non-profit and for-profit type hospitals. It was felt that the objectives of these two (2) types of hospitals might differ from each other when a decision involving both economic and intangible criteria, had to be made. Municipally owned hospitals were eliminated from the survey because it was felt that many of their policy decisions were politically motivated.
2. Service Type - It was important to get a mix of hospitals using various types of linen services such as in-house, commercial, or shared service. In this way a comparison could be made between the criteria employed by an institution using one type of laundry service versus one using another type.
3. Hospital Location - This is perhaps the least important of the three (3) differences listed here. However, it was felt that even if two hospitals employed the same service and were maintained by the same type of ownership, they might still have some differences in their decision criteria used, due to the difference in their locational areas. The two (2) areas considered were large and small city ones.

In order to have each area and all types within each area covered within a restricted time limit, the survey was designed so that only six (6) hospitals were needed. In this way a sample of each hospital ownership, service, and location type was covered using a minimum number of hospitals. Although this sample size is small, by using the "critical incident technique" in conducting the survey, the importance of the number surveyed became negligible.

Method of Interviewing

When an institution selected expressed a willingness to participate in the survey, an appointment was made for an interview with an administrative representative of its laundry department and a questionnaire was sent out to that person in advance of the meeting date. In this way, the person involved had an opportunity to collect the necessary data concerning the material to be covered in the subsequent interview.

The interview, as mentioned previously, was conducted using the "critical incident technique." (See General Background section for a detailed explanation of the technique.) The questions used came directly from the questionnaire which as previously mentioned was designed to allow the interviewee to respond with his own ideas and views. Examples were given both on the questionnaire and by the interviewer for the sole purpose of making the aim of the

questions clearer to the interviewee.

The interviews were conducted in such a way as to allow participation by hospitals with differing laundry situations. For instance, some hospitals had made a recent change from one type of service to another, while others had not had a change in twenty (20) years, and others had never made a change at any time. Thus, the style of certain questions had to be altered depending upon the situation in which that particular hospital being interviewed was involved. Instead of phrasing a question, "When you made your changeover from the previous to the present service what criteria did you consider?" the form became more like, "If you were to make a changeover from your present system to a new one what criteria would you consider?" By doing this, it enabled this writer to get a more indepth look at the decision processes used by administrators whose hospitals not only had different physical backgrounds, but also differing situational backgrounds as well.

The most important aspect of the interview was that the true intention of the thesis was directly conveyed by this writer, to each individual participant. Thus, there was no misunderstanding as to what type of data was being sought and for what purpose. Each person interviewed was made aware that he was not to become a proponent of his

hospital's type of laundry service as being the best one possible for all institutions. Rather, he was made to understand that he was only part of a survey being conducted to determine whether administrators in general were giving full consideration to all aspects of the criteria necessary for making a good decision as to what was the best service for their individual institutions. The interviews were conducted to achieve these ends and to ensure that the questions were answered in that light.

Data Analysis

After all of the data on the decision criteria used by the administrators in making their service selections had been collected, it had to be arranged in such a way as to allow analysis of a) whether there was agreement among the administrators upon what criteria was important and b) whether all of the criteria necessary for making a good decision (see Appendix III) had been fully considered by all of the participants.

In order to accomplish these objectives, the ranking method described in the General Background section was used. A matrix consisting of five (5) columns and six (6) rows was formed. Each column was headed by one (1) of the five (5) decision areas previously mentioned; philosophy, facilities, personnel, cost, and quality. Each hospital involved, headed its own row. In order to fill in the

ranks given by each hospital administrator for each of the column areas listed, the data collected from questions twelve (12) and thirteen (13) of the questionnaire had to be classified. Each of the criteria listed by the participants in response to these questions was checked against a comprehensive list of the categorical areas and their criterial listings found in Appendix III. As each hospital's criteria was categorized, a rank ordering of the categories used in the decision process by that hospital was established. For example, suppose Hospital X listed "Economic Justification" as the most important criterion in the decision process. Firstly the category under which this criterion falls would be found. For this criterion, the appropriate category is Cost. Secondly, since a criterion from this area was ranked first in importance, the category is similarly ranked first. Thus, one (1) is placed in the row headed by Hospital X and in the column headed "Cost." The remainder of the matrix is filled out using the same methodology. Should two (2) or more criteria be ranked from the same area and not follow successively after one another in order, the category receives the ranking of its highest ordered rank. So, if two (2) criteria from the Cost area were ranked one (1) and five (5), Cost would still be ranked one (1).

If it occurred that a participant did not list any

criteria pertaining to one (1) or more of the categorical areas, the remaining ranks were added and divided by the number of his unranked areas. That number was then assigned as a rank value to each of the remaining areas. For example, if Hospital X ranked Cost as one (1), Quality as two (2), and Philosophy as three (3) but did not rank either Facilities or Personnel, the remaining ranks of four (4) and five (5) would be added together. The resulting number nine (9) would then be divided by two (2) (the number of remaining unranked categories) and the number 4.5 would then be assigned as a rank to these two (2) previously unranked categories. This procedure was done for two (2) reasons; 1) it was assumed that even if these areas weren't specified by the participant, some consideration, no matter how minimal, must have been given to them and 2) the intent here was to see if there was agreement among the hospitals so this action would in no way affect the eventual results determined.

After the matrix was completely filled out, the analysis as described in the Rank Testing section was performed to determine if there was agreement among the administrators concerning the importance of each decision area in the selection process. If agreement was found, a "true rank" estimate could be given to each area based upon the participants' ranks.

After all of this had been accomplished, a determination had to be made as to whether or not full consideration was given to all of the criterial aspects necessary to make a good decision. (If there was in fact agreement, a check had to be made on what was being agreed upon.) This was done by taking each individual hospital's responses and comparing it against the list found in Appendix III. Those listings not applying to the particular situation of an individual hospital were ignored when that hospital was undergoing comparison. A percentage of criterial consideration was then found for each hospital. This was done by taking the number of criteria considered and dividing it by the number of criteria applicable to that situation, which should have been considered. The resulting number was then multiplied by one hundred (100). A grand total percentage of critical consideration of all the hospitals involved was also determined by summing the numerator and denominator values of each individual case, dividing as before, and multiplying the result by one hundred (100).

The final result was a determination of whether or not enough attention was being paid to the decision of what laundry service to use. Any percentage of consideration less than 100% indicated that the administrators involved were not fully considering all aspects of the selection

process necessary for making the best decision possible. If it was found that the percentages were in fact less than 100%, a listing of those criteria most neglected by the administrators was made. This was done solely for the edification of those who will have to make similar decisions in the future.

Results

This section deals with the categorization of the data collected in the interviews conducted with the participating hospital administrative representatives. The section is divided into two (2) parts, using the following format: Part One (1) is concerned with the consensus (or lack of consensus) of the collective participants surveyed as to the rank ordering of the five (5) decision areas. Part Two (2) covers the criterial listings (see Appendix III) under each area and the determination of which of these criteria were considered in the decision process by each of the participants involved.

As was noted previously, six (6) hospitals were used in this survey. Despite the fact that this is a rather small sample size, the outcome of the results is still quite valid, since the interviews were conducted using the Critical Incident Technique. Furthermore, the hospitals surveyed were chosen in such a way as to allow coverage of each of the three (3) basic aspects of institutional difference (type of ownership, type of service, and location) by at least one (1) representative.

The following discussion is not nor was it intended to be mathematically rigorous. Since the areas of concern are in effect subjective, it follows that a report on them

should also be rather subjective. The intention of this paper is to outline what should be considered in a laundry selection process by any administrator who will at some future time be faced with making such a decision. This objective can best be accomplished through a non-objective procedure as is presented here.

Rank Order Consensus

The rankings supplied by each participant are listed in Table 1. Although none of the participants directly listed and ranked the Personnel area as an important criterial area, various answers given by these people and the situations involving each of their hospitals indicated that some consideration had indeed been given to this area. For instance, those hospitals (C,D, and E) with excellent laundry managers have never changed nor considered changing from an in-house facility to another type of service. Hospitals A and B had in-house services, but changed after losing their good laundry managers. Hospital F never had a technically trained laundry manager and subsequently has never had an in-house service.

By looking at Table 1, it appears that the six (6) administrative representatives agree on the rank ordering of the five (5) decision areas. However, to be absolutely sure an analysis was done, using the Coefficient of Con-

Table 1:

Criteria Area Rankings of the Hospital Administrators

Hospital Designation	Administrative Control	Facilities	Personnel	Cost	Quality
A	3	4	5	2	1
B	3	1	4½	2	4½
C	2	4	4	4	1
D	3	4½	4½	2	1
E	3	4½	4½	2	1
F	3	4	5	2	1
Total of Ranks	17	22	27½	14	9½

cordance, as described in the General Background Section (see Appendix IV for results).

The results obtained by the nonparametric test show that the representatives did in fact agree on the rank ordering of the decision areas. Therefore, it was possible to estimate the actual ranking of each area based on the combined estimates of the participants. The final estimates of the ranks were:

Table 2: Rank Consensus of the Five Areas

	<u>True Rank</u>
Quality	1
Cost	2
Administrative Control	3
Facilities	4
Personnel	5

Criteria Considerations

After finding out that there was in fact agreement among the participants as to the rank ordering of the five (5) criterial areas and establishing a true ranking of the areas, another equally important determination had to be made. This determination involved the criterial listings under each of the five (5) areas. By reviewing the answers given by each of the participants in his interview and matching the responses against the listings found in

Appendix III, it was possible to ascertain the results concerning this aspect of the study. These results are found in Table 3.

Percentage values of the criterial listings considered by each individual participant and total percentage value of the participants as a group were determined for each of the five (5) areas. They can be found in Figures 1 - 5. Figure 6 shows the percentage values of both the individual and group considerations for all of the listings possible.

As can be seen in Table 3 and Figure 1, each participant and the group as a whole considered all of the criteria listed under the area of Administrative Control.

In Figure 2, we see that hospital A considered only 29% of the criteria listed under Facilities. This was due to the fact that no consideration was given to an in-house facility when the decision was made to change from a shared to a commercial service. Hospital B considered 85% of the criteria, omitting only the consideration of ease of a facility changeover. This criterion was overshadowed by the hospital's feeling of community responsibility and therefore was excluded from the decision process. Overall, the group considered 85% of the possible criterial aspects of this area.

The area of Personnel seemed to get the least attention of any of the five (5) areas considered. As is seen

Table 3: Criteria Considered by the Administrators

	A	B	C	D	E	F
Administrative Control						
a	+	+	+	+	+	+
b	+	+	+	+	+	+
c	+	+	+	+	+	+
Facilities						
a	-	+	+	+	+	+
b	-	+	+	+	+	+
c	-	+	+	+	+	+
d	-	+	+	+	+	+
e	-	+	+	+	+	+
f	+	+	+	+	+	+
g	+	-	+	+	+	+
Personnel						
a	-	-	+	+	+	+
b	-	-	+	+	+	+
c	-	-	+	+	+	+
d	-	-	+	+	+	+
Cost						
a	+	+	+	+	+	+
b	+	-	+	+	+	+
Quality						
a	+	-	+	+	+	+
b	+	-	+	+	+	+
c	+	-	+	+	+	+
d	+	-	+	+	+	+

+ indicates criteria was considered

- indicates criteria was not considered

in Figure 3, both hospitals A and B gave no consideration to any of the listings in this area. Hospital A did not look at this area, because it currently employs a linen distribution manager who has little knowledge of the workings of any laundry service. He is gaining his knowledge through his on-the-job experiences. Hospital B had its laundry manager leave the institution for some reason unknown to this writer. They were either unable to or did not try to replace him. Instead, the service was changed to a shared service. It was the administrative feeling at that time that the cooperative organization would provide the necessary managerial functions.

Hospital F, although not possessing a technically qualified laundry manager, does employ a person in charge of this function who knows how to deal with commercial firms on a tough, financial basis. They realize that an in-house service is not possible, but feel that this person is capable of holding her own when dealing with the contracted services.

Overall, the group considered 67% of all of the criterial listings possible for consideration.

The Cost area as shown in Figure 4 shows that hospital B considered only one (1) of the two (2) criteria listed (50% consideration). Once again, the overshadowing of this hospital's feeling of community responsibility caused

Figure 1: Amount of Administrative Control Criteria Considered by the Administrators

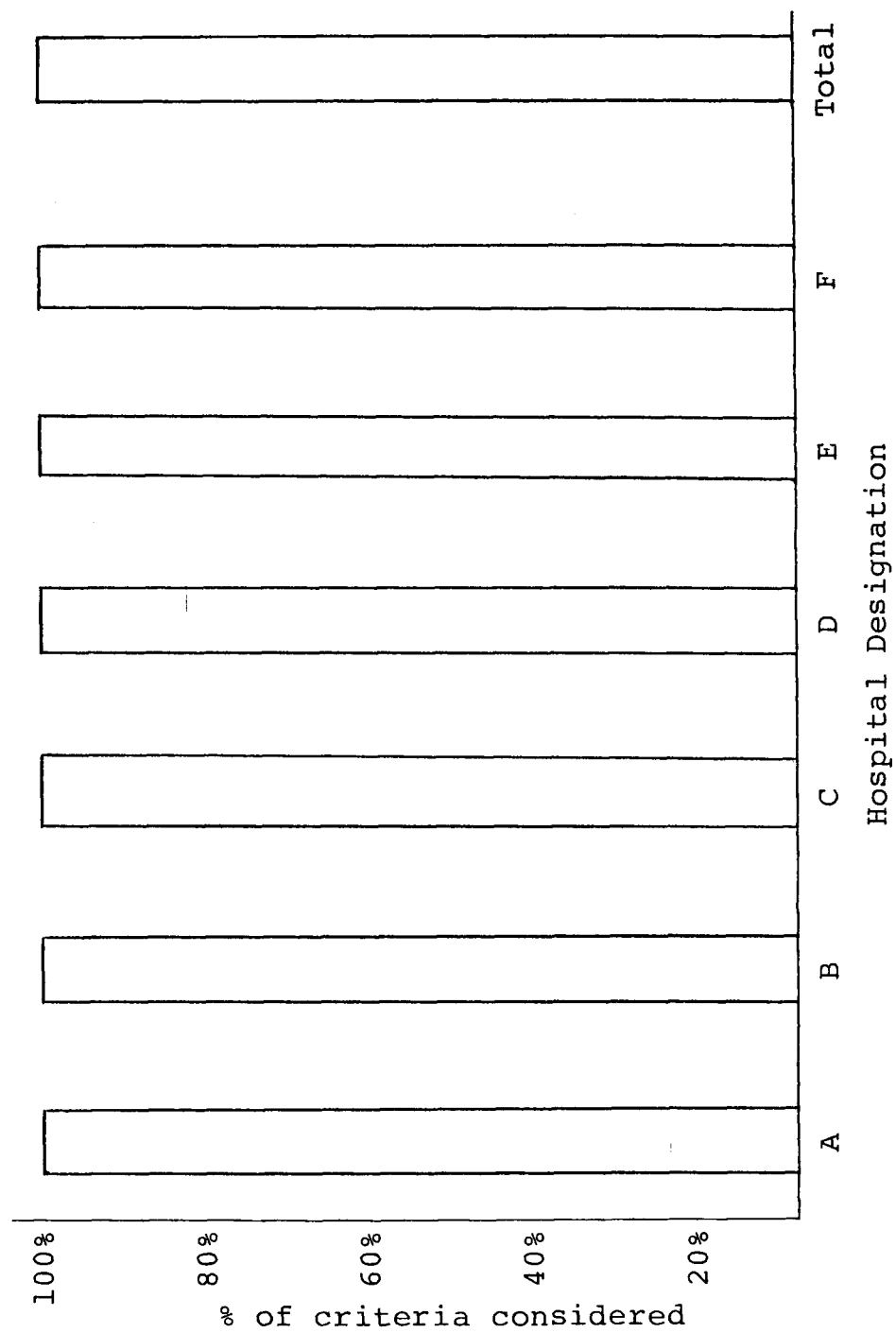


Figure 2: Amount of Facilities Criteria Considered by the Administrators

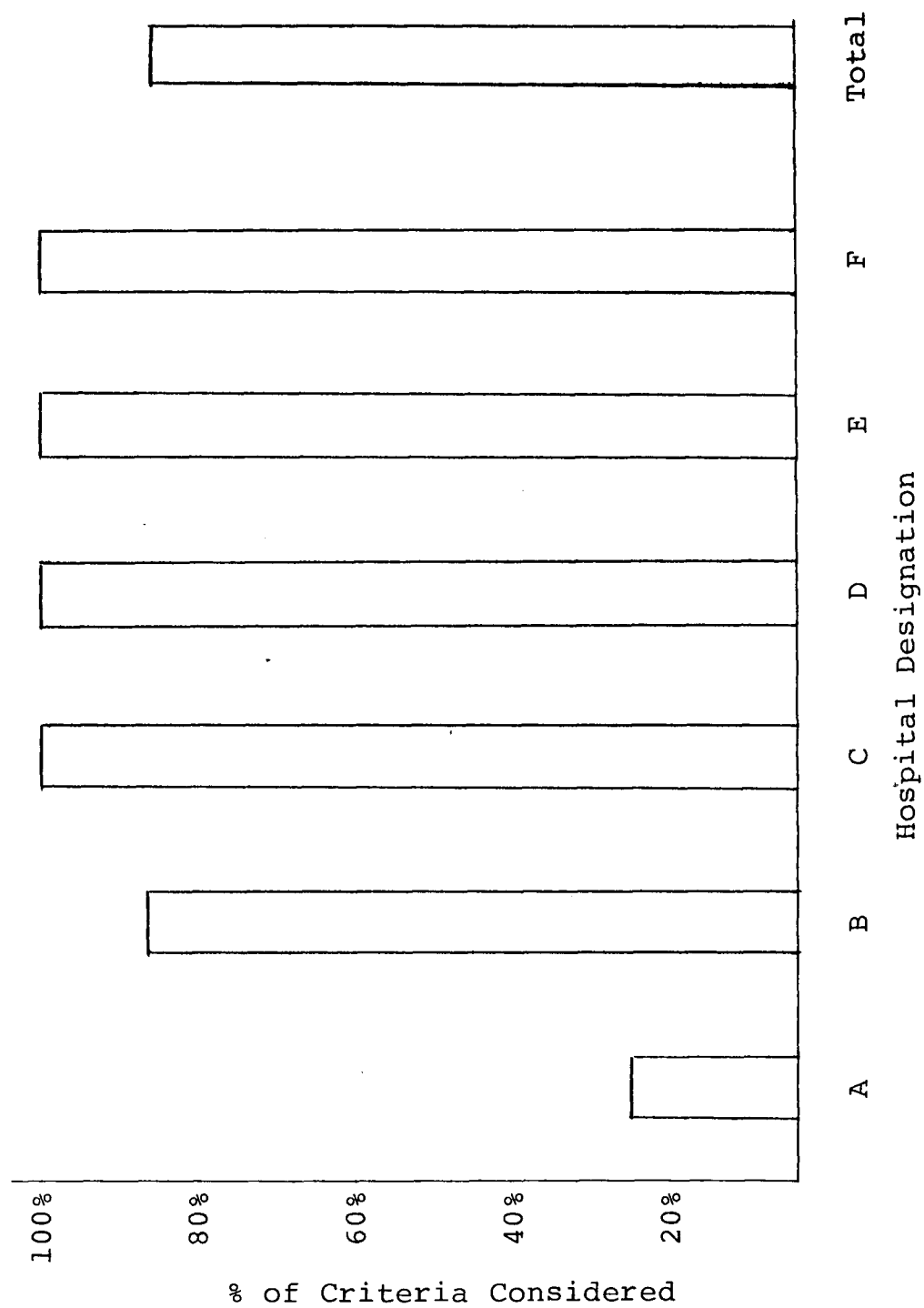
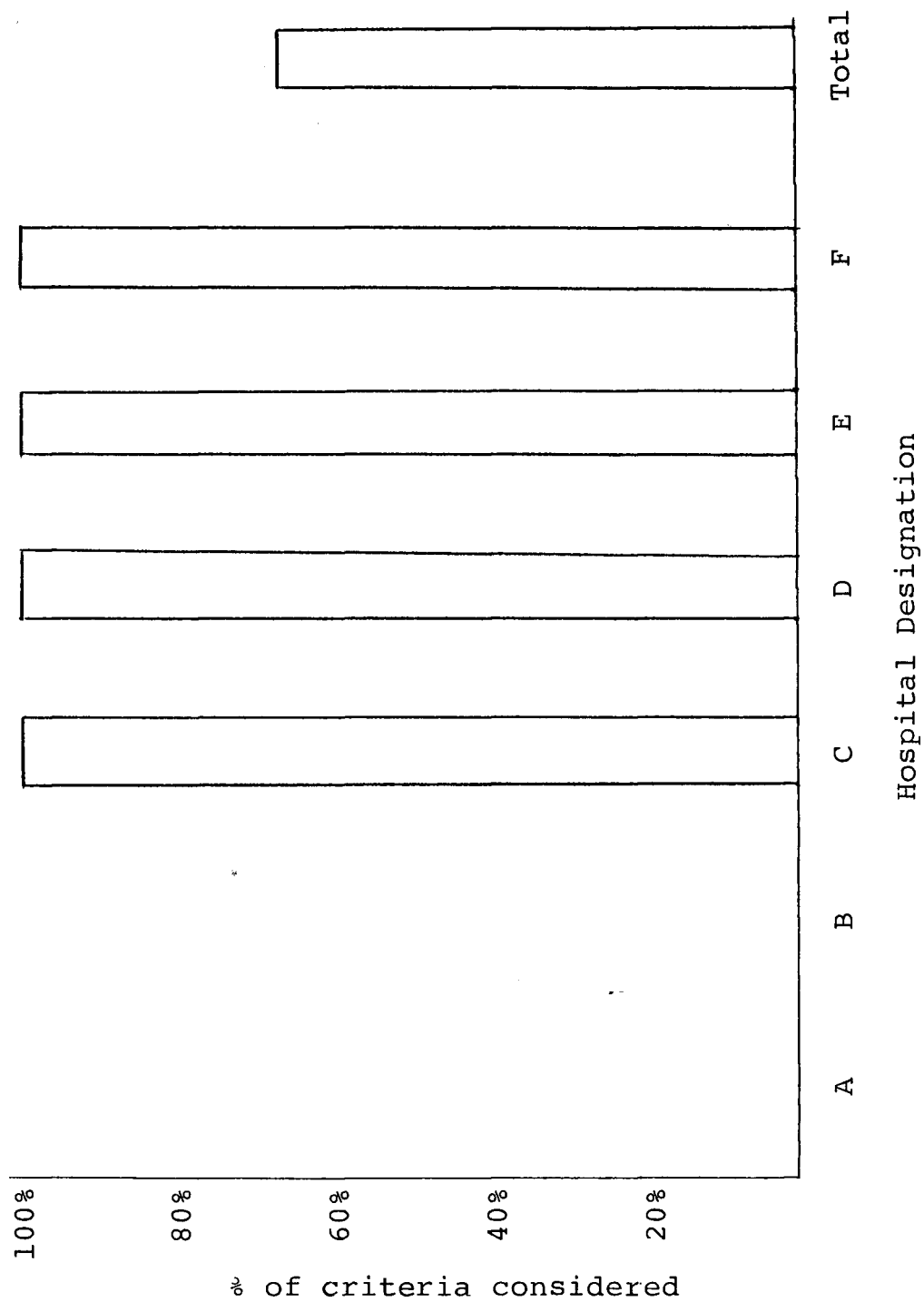


Figure 3: Amount of Personnel Criteria Considered by the Administrators



those involved to overlook the fact that they would be tied to a 14 year contract. The group as a whole gave 92% consideration to the criteria of this area.

The last area of consideration, Quality, received only 75% consideration from hospital F and 0% from hospital B. The reason for the incomplete consideration from hospital F is due to the fact that the hospital deals only with small laundry firms on a no-contract basis. Thus, this problem of a non-delivery of linens has never been encountered by them, nor is it expected to ever occur. Hospital B considered none of these criteria, since those involved in the decision process felt that these were management problems which could be solved. Overall, the groups as a whole considered 80% of the criteria listed in this area.

In Figure 6, the total percentage figures for all of the criterial considerations are shown. Hospitals A and B each considered 55% or less of the criteria listed while hospitals C - F considered 95% or more of the listings. Totally, all six (6) hospitals considered 83% of all of the criteria listed. Those responsible for making the considerations were predominately administrative personnel. In only one (1) case was the decision made by non-administrative personnel (see Appendix II, each hospital's answer to question 7).

Figure 4: Amount of Cost Criteria Considered by the Administrators

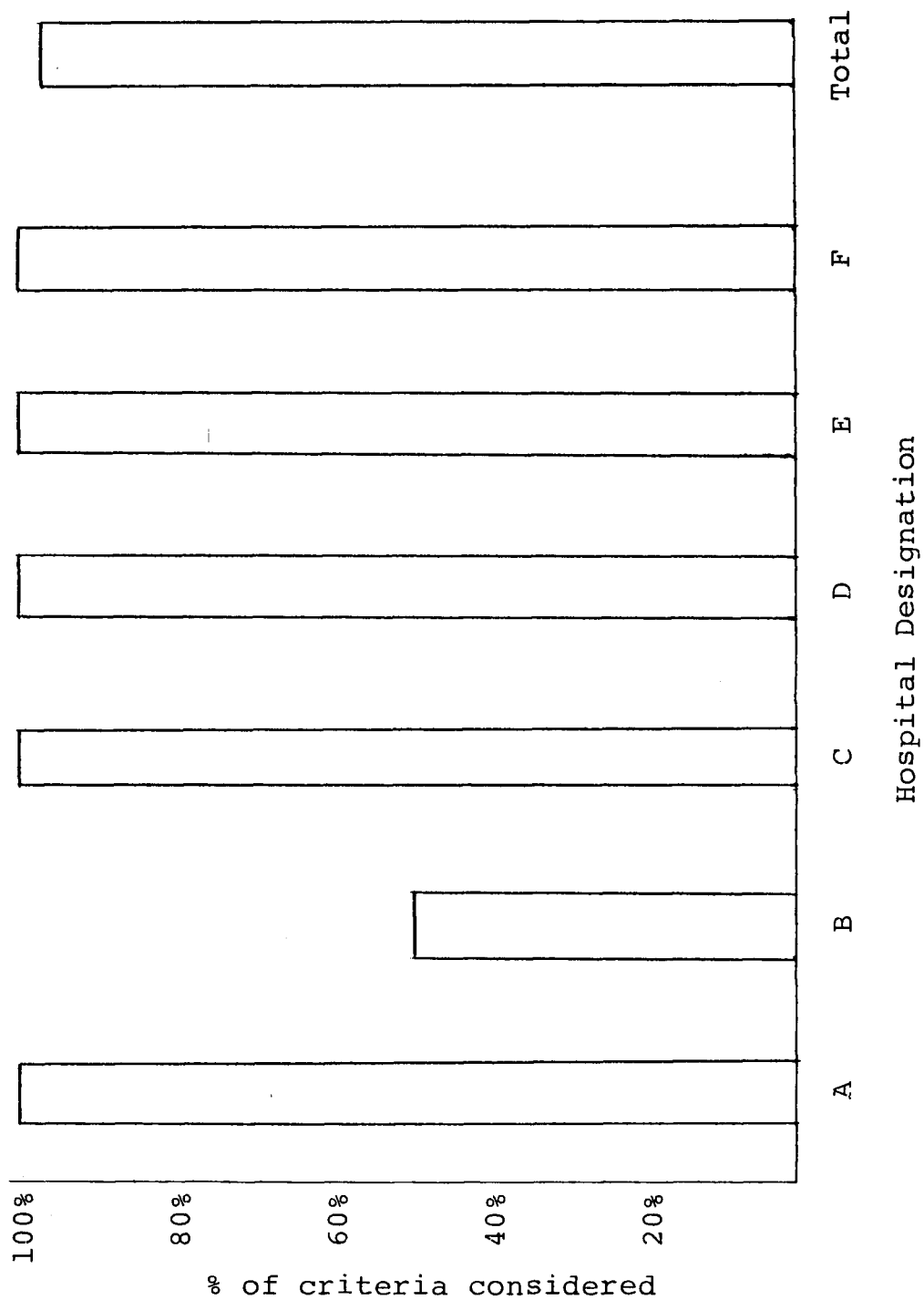


Figure 5: Amount of Quality Criteria Considered by the Administrators

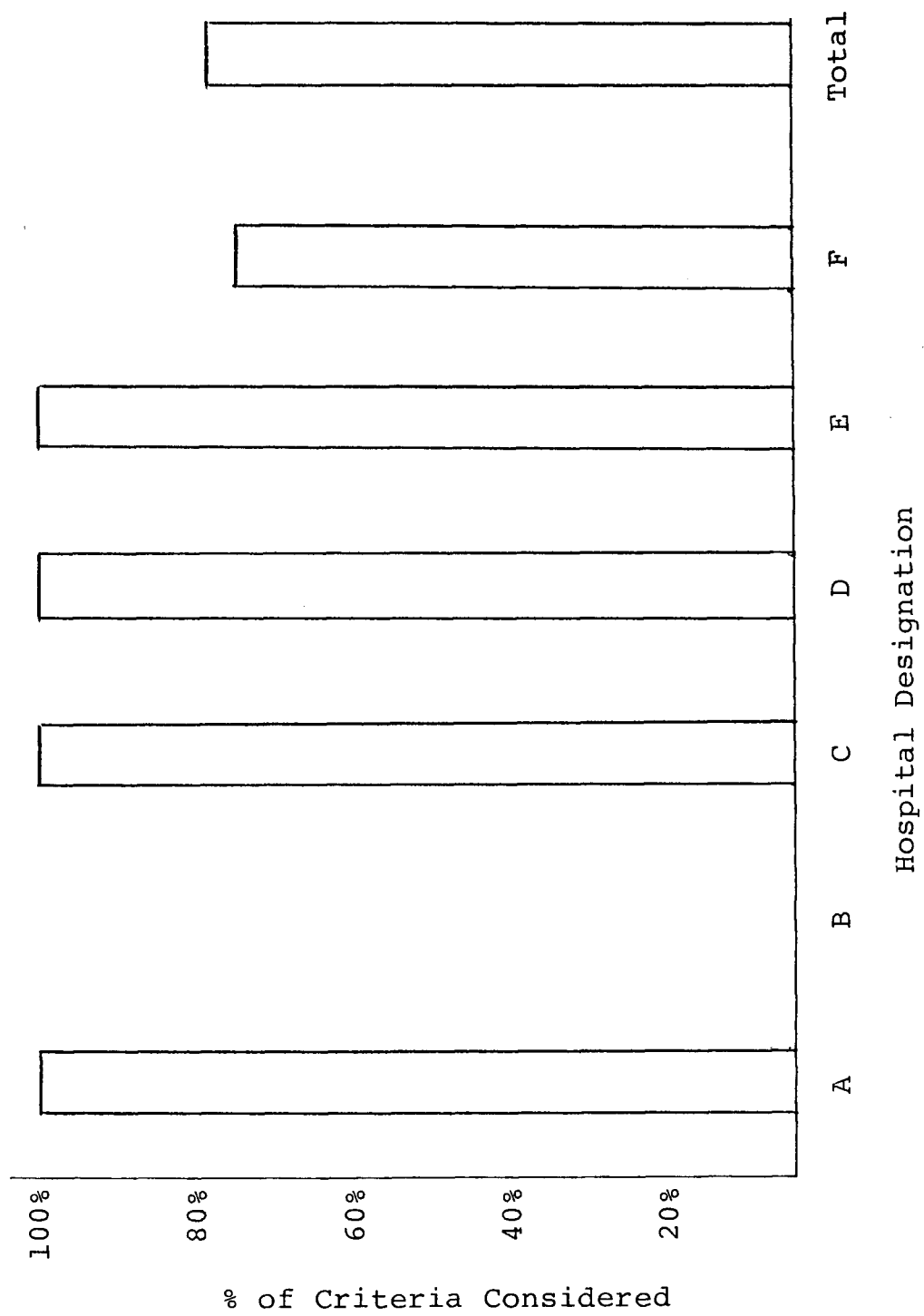
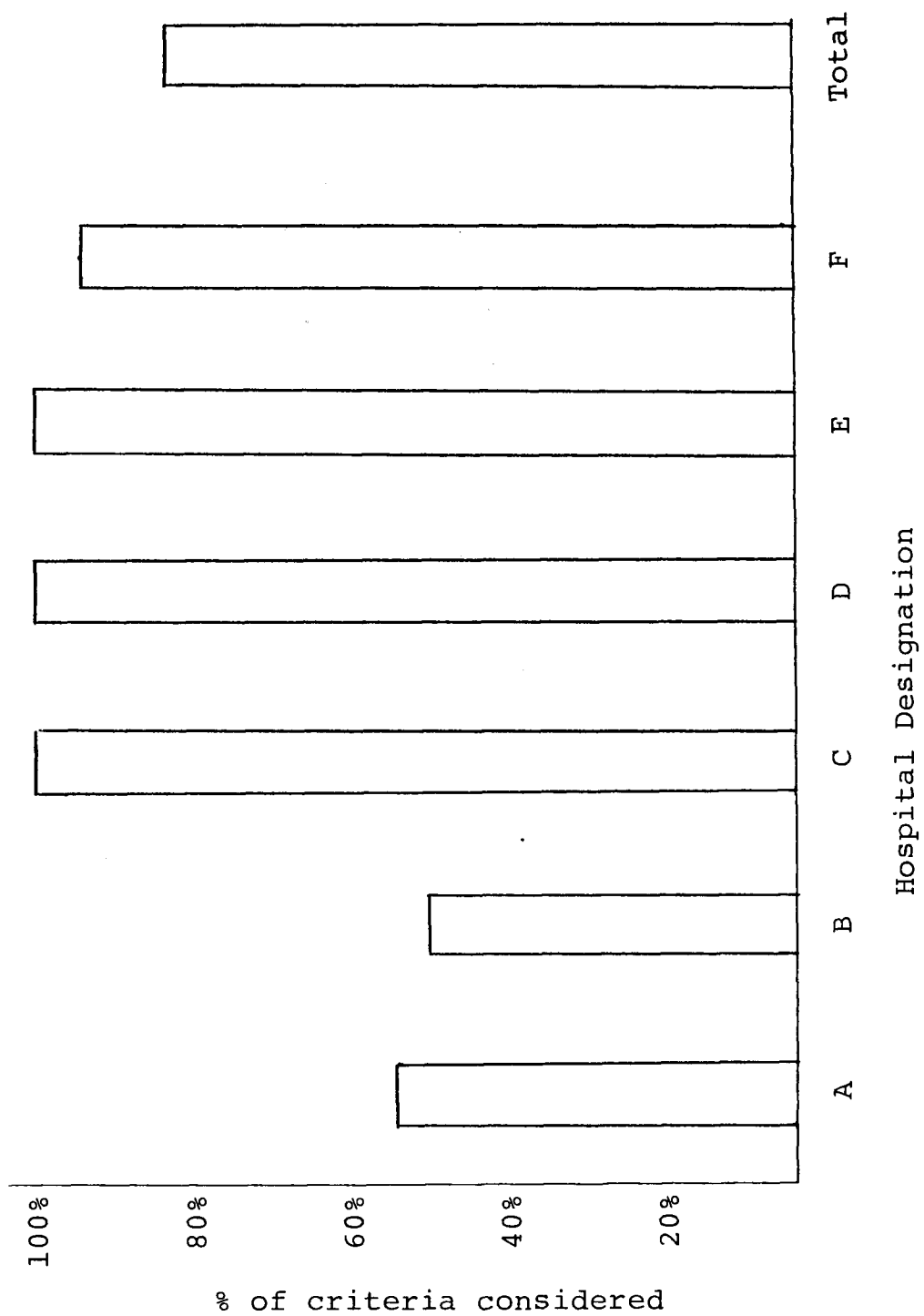


Figure 6: Total Criteria Consideration of All Areas by the Administrators



Conclusions

Despite the relatively small sample size used in this thesis, there are in fact some valid inferences which may be drawn from the results found. The conclusions presented here apply specifically to these results, but due to the way in which this work was conducted (use of the Critical Incident Technique), they may be generally applied to the field as a whole. It is felt that since 1) there has been little factual information written on this particular aspect of the laundry decision process and 2) much of the writing in this area seems to deal in generalities, this paper represents a definite contribution to the field of hospital management.

As was expected by this writer, the various administrators did agree on the rankings of the five (5) criterial areas. Thus, it can be concluded that despite variations in type of ownership, service, and location, hospitals have basically the same concerns facing them when deciding on the use of a particular laundry service. Furthermore, the results bear out the hypothesis that such a decision is not necessarily a strictly economic one [22]. Five (5) out of six (6) of the hospitals surveyed chose Quality as the most important area of decision concern. This may be attributed to the general feeling of the med-

ical field today, concerning patient comfort and care. This feeling is intermingled with the fear that unless these functions are provided by the services being used, lawsuits from dissatisfied patients will ensue.

The area of Quality received excellent consideration from all but one (1) hospital surveyed. Concern should be shown here for that one (1) exception, since the feelings expressed by that representative may also be held by other hospital administrators involved in similar circumstances. Quality is a real concern and should not be lightly treated as a management problem which presumably can be handled. Even the most competent management people may run into extenuating circumstances which cause the maintenance of Quality to be a baffling problem with no easy solution.

The long established myth that Cost is the most important criterion in any service selection process was not entirely dispelled by this survey, but it was certainly shaken by the results found here. All but one (1) of the six (6) hospitals interviewed listed this as the second area of concern. However, it should be noted that this was a strong number two (2) ranking and that in itself leaves some doubt as to whether or not it actually does in fact occupy the number one (1) position of concern still. Not one person interviewed would venture to state what action he would recommend if he were faced with the choice of hav-

ing fair quality at a low cost or good quality at a much higher (35% - 50% higher) cost.

The best explanation of why no one fully ventured to offer an opinion on this situation is the choice of Administrative Control as the third area of consideration. It was the feeling of most of the people interviewed that if Quality was being maintained then the administrator in charge had good control of the service environment. Such control is both a result of good Quality and also a cause of it (much like the chicken and the egg riddle). Therefore, the participants had no doubt that Cost would be kept at a reasonable level, and price competitive with that offered by various other alternative services.

The fourth ranked area of consideration, Facilities, received much consideration from five (5) of the six (6) hospitals participating. Hospital A did not consider this area extensively, because of the fact that there was no equipment on the premises at the time of their changeover decision. What seems to be the case with this and most likely many other hospitals is to disregard looking at an in-house facility as a viable alternative if there is not a facility already on the premises. Considering the fact that many metropolitan hotels (businesses whose basic goal is to make a profit) are beginning to start up their own in-house facilities, it would seem that hospitals (many of

which are non-profit) should follow suit and seriously consider this as a service alternative.

The last area of concern and as seen here the most overlooked of all the areas covered, is Personnel. Most hospitals, even those which did show some consideration of this area, tend to overlook the fact that a good laundry manager is essential to the efficient implementation of any service. Those hospitals such as C - E, which employ excellent in-house facility managers, seem to take it for granted that the laundry is running effectively. Little attention is paid to the manager when the situation is such, but should the operation go slightly out of control and the manager is immediately called on the carpet to explain why. A good, effective laundry manager will rarely be noticed by the hospital hierarchy.

Those hospitals, such as A and B which do not have a qualified laundry person overseeing their linen system, seem to rely heavily on a contracted service (either commercial or shared service) to provide the missing managerial functions. Hospital F as previously mentioned uses their manager's knowledge of finance to pressure their commercial service supplier into maintaining good service to the institution.

If we look at the overall picture of the criterial consideration being given to the decision process (Figure 6) we see that 83% of the criteria listed in Appendix III

were covered by the six (6) hospitals surveyed. This seems like an impressive number, but anything less than 100% should be an unacceptable value. The reason for this statement stems from the fact that if we look at each hospital individually, we see that A considered only 55% and B only 50% of the criteria possible. Understandably, neither is totally satisfied with the service currently in use in their institutions. If we were to expand this to a national figure, in essence one-third ($1/3$) of the hospitals in this country are giving only about one-half ($1/2$) of the total consideration necessary to the important determination process of what type of linen service is best for their institutions. Furthermore, approximately the same number are dissatisfied with the service they currently employ.

What has been presented here is an interweaving of five (5) individual yet somewhat dependent areas which comprise the entire workings of the laundry service system. No matter which service is chosen by a hospital, these five (5) areas play an influencing role in the effectiveness and efficiency of the entire operation.

Despite the freedom allowed each participant to express his views concerning important decision areas, no new areas of concern were developed. The only additional suggestion made by any of the participants was that an admin-

istrator when contemplating a change of service should hire an independent consultant to study the alternatives available to the hospital. The administrator should then discriminately use the consultant's findings along with any other relevant information and make his final decision.

It is this writer's opinion that a consultant could be used as an unbiased investigator of the various alternatives open to the hospital. This would make the service study open to fair consideration by someone who supposedly should have no vested interests in the eventual decision. However, the study should be taken at face value only. The administrator, armed with the listings provided in Appendix III should force the consultant to consider each of the criteria before submitting a final recommendation. Furthermore, the consultant should be able and asked by the administrator to prove that his findings are in fact accurate and reliable.

What then should an administrator do to insure that he is getting the best possible service for his hospital? No system is infallible, but until new discoveries come along, it is felt that there is no better way to approach the decision process than as follows:

1. Rank the five (5) major areas of concern in order of the importance each is figured to have on the final decision. Hopefully the rankings will match

the consensus found here. If not, then the administrator should not be overly concerned since differing circumstances will warrant different rankings.

2. An unbiased investigator with sufficient knowledge of hospital laundry services should be employed to do the study work. If there is no one available in the hospital organization, a consultant should be hired.
3. A check should be made to make sure that the investigator considers all possible alternatives available. Unless this is done, the hospital may be getting cheated out of obtaining the best service available for its uses.
4. The study should be gone over carefully. The considerations of each alternative should be compared with the listing found in Appendix III to ensure that all of the criteria are adequately covered. All findings should be checked to make sure they have some measure of proof backing them up.
5. Before a final decision is made the administrator should make sure that the proposed alternative acceptably covers the main areas of consideration (so that the administrator can safely feel that he will

have the desired Quality, Control, Cost, Personnel and Facilities to run an effective system). If the alternative selected does not acceptably cover these five (5) areas in the order specified, then provisions should be made to either revise the service in some form or choose another more acceptable alternative.

6. After the service is instituted, there should be periodic checks and reports made on its effectiveness and efficiency, regardless of the fact that it may be functioning properly. The administrator should not wait for problems to arise before paying any attention to it.

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APPENDIX I

Q U E S T I O N N A I R E

Questionnaire

1. Name of hospital
2. Location of hospital
3. Size of hospital (total beds)
4. Type of hospital (general or specialty)
5. Type of hospital ownership (not for profit or for profit)
6. What type of linen service is currently being used by your hospital? (shared service, in-house facility, etc.)
7. What people were responsible for the decision as to what type of service should be used by the hospital?
8. Is the present system the same system that has always been used by the hospital, or has there been a change (or a number of changes) in linen services throughout the effective life of the hospital?
9. When was this particular linen service begun to be used and what service was used prior to its inception?
10. What caused you to consider using another linen service from the one you were using previously?
11. When this service was decided upon, what other type of services were considered with it at that time?
12. What criteria were used by the people involved in making the decision as to which service to use?
 - a. Economic justification
 - b. Ease of receipt from supplier
 - c. Space required for storage
 - d. Space required for laundry equipment (if used)
 - e. Daily supply needs and the probability of having those needs filled (amount of linen required - daily, yearly)

- f. Amount of control the hospital would have over the linen service provided.
 - g. Quality control of the linens received or processed
 - h. Thoughts on ease of obtaining a back-up service, should some misfunction occur with the present system.
 - i. Difficulty in changing to a new system from the present one (due to commitments: contracts, capital expenditures, etc.), should the hospital experience dissatisfaction.
 - j. Other criteria (Please specify)
- 13. Rank order each of the criteria used in the linen service decision from most to least important. (If you have 10 criteria, 1 would represent the most important and 10 the least important.)
 - 14. Was each of the criteria listed previously used solely on a subjective basis? If there are some that have an objective backing, please list them and their backing (tests, predetermined levels, etc.).
 - 15. In any or all of the alternatives considered, were there any outstanding points which made you shun away from those alternatives as your service selection?
 - 16. Are there any areas of the service you are presently using which you are not satisfied with? Did you consider these areas in your criteria when you made your service selection?
 - 17. About how long (in days, months, years) did it take for the decision to be made as to what type of service to use?
 - 18. Are there any salient points to the choosing of a linen service that I did not cover here which you feel are important? If so, what are they and what is their importance?

APPENDIX II

Questionnaire Responses

1. Hospital A
2. Small city
3. 122 adult - pediatric beds, 10 nursing beds and 72 extended care beds
4. General hospital
5. Non-profit hospital
6. Commercial service
7. Administrative decision
8. Original service was in-house; next a commercial was used followed by a shared service (last service before the one presently used).
9. Present system begun 6 months ago.
10. 1) Poor service - didn't know when fresh linens would arrive or soileds would be picked up
- 2) Poor quality - linens shipped were occasionally soiled, torn, full of lint.
- 3) Shared service had a poor grasp of inventory control - service would allow shortages of certain items, while oversupplying other items.
- 4) Cost of service became prohibitive
11. The shared service previously used was compared with the present commercial service.

12-13.	<u>CRITERIA</u>	<u>RANK ORDER</u>
	g) Quality control	1
	e) Quantity control	2
	a) Economic justification	3
	b) Ease of receipt	4
	f) Amount of hospital control	5
	h) Back-up service	6
	i) Ease of change	7

14. All criteria have only a subjective basis. Usually judgment is made solely by eyeballing the situation.
15. None outstanding points made any alternative less desirable and subject to immediate nonconsideration
16. A problem has arisen in that short sheets have been found in the system (less than the required 96 inches). This problem is felt to be the hospital employees' fault, since these sheets should not be placed on the beds, but instead should be put in reject bags. The linen service will then remove them from the service.
17. It took 9 months to decide on the new service.
18. No other points to be considered.

1. Hospital B
2. Small city
3. 456 beds
4. General hospital
5. Non-profit hospital
6. Central cooperative service
7. Administration and board of trustees decision
8. Previous service was an in-house laundry.
9. Present system began July, 1970.
10. A cooperative venture of various hospitals in the area was begun and this institution decided to join because
 - 1) a larger in-house facility was needed and there was no room for either expansion or a completely new facility.
 - 2) It was expected that the cost involved with joining a shared service would be less than that of buying new equipment and running the in-house operation.
 - 3) A good citizen concept was taken by the hospital, whereby they agreed to cooperate with the neighboring hospitals.
11. No alternatives were considered.

12-13.

<u>CRITERIA</u>	<u>RANK ORDER</u>
d) Space required for equipment	1
a) Economic justification	2
j) Community cooperation	3

14. Felt this question was not applicable.

15. Felt this question was not applicable.

16. The hospital is not entirely satisfied with the new service's linen quality. Furthermore, there seem to be some problems both with the management of the

service and also with the equipment used. These problems stem from poor job done by a laundry consultant called in to get the system running smoothly. These problems were not considered beforehand, because they were and are felt to be management problems which could be solved.

17. Decision time was 2 to 3 months because the criteria used were clear and uncontested.
18. All points seem to be covered. A last thought of importance is that the hospital is locked into a 15 year contract with the service.

1. Hospital C
2. Large city
3. 945 beds
4. General - teaching hospital
5. Non-profit hospital
6. In-house facility service
7. Administrative decision
8. Have always had an in-house facility.
9. Question was not applicable.
10. Question was not applicable.
11. There has been no recent concern for a service change, although some thought is being given to starting a shared service with 2 other hospitals.
- 12-13.

<u>CRITERIA</u>	<u>RANK ORDER</u>
e) Daily supply needs	1
f) Amount of hospital control	2
g) Quality control	3
h) Back-up service	4
14. Random samples (at least once every 10 days) are sent to the hospital lab for a bacteria count. The hospital infection control committee does random sample work involving various tests.	
15. No, in all fairness to the other services, there is not one point which could be taken as a discounting factor in their consideration as viable alternatives to the present system.	
16. Yes, there are 2 areas:	
1) Lack of space - currently producing maximum number of linens at this time. There is little room for expansion.	

- 2) General manual inefficiency - various minor changes could be made which would cut down on the number of laundry employees, thereby reducing costs.

17. Question was not applicable.

18. No other points to be considered.

1. Hospital D
2. Large city
3. 44 beds
4. Specialized - research hospital
5. 38% government grant, 62% endowment
6. In-house facility service
7. Administrative decision
8. Have always had an in-house facility.
9. Question was not applicable.
10. Question was not applicable.
11. No alternative service has ever been considered.
- 12-13.

<u>CRITERIA</u>	<u>RANK ORDER</u>
e) Daily supply needs	1
g) Quality control	2
a) Economic justification	3
f) Amount of hospital control	4
14. No real tests are used to test linen quality. Any linens which have visible tears or stains are removed from the system.	
15. No, any administrator involved in selecting a linen service should visit other institutions using various types of services to get an idea of their benefits and shortcomings. No alternative should be totally ex- cluded for any one single reason.	
16. At this time, there are no areas which are unsatisfac- tory.	
17. Question was not applicable.	
18. Consideration must be given to the trend which is oc- curring in the hotel industry where they are changing	

to in-house services. It is an interesting development since these businesses must make a profit in order to stay in operation. What is good for one hospital in terms of service is not necessarily good for others. Therefore, the concerned administrators should use reports issued by those who know the laundry business, such as consultants, managers, etc. and then make sure that they ask enough questions to get all the facts that they need in order to make a good decision.

1. Hospital E
2. Large city
3. 263 beds
4. General hospital
5. Non-profit hospital
6. In-house facility service
7. Administrative decision
8. Have always had an in-house facility.
9. Question was not applicable.
10. Question was not applicable.
11. No alternative service has ever been considered.

12-13.

CRITERIA

RANK ORDER

- | | | |
|-------------------------------|---|------|
| e) Daily supply needs | 1 |)tie |
| g) Quality control | 2 | |
| a) Economic justification | 3 | |
| f) Amount of hospital control | 4 | |
| i) Ease of change | 5 | |
| h) Back-up service | 6 | |

14. Tests are run on linen tensile strength and cleanliness retention by I.F.I. The hospital's infection control committee does random sampling on bacteria count.
15. No, a full study of all aspects of all alternatives should be made before any final decision is made.
16. No real problems are visible. There are however some minor adjustments which are always possibilities for improvements which can be made.
17. Question was not applicable.
18. No other points to be considered.

1. Hospital F
2. Small city
3. 108 beds
4. Psychiatric hospital
5. For profit hospital
6. Commercial service with some in-house service done.
7. Director of housekeeping
8. Changed commercial services
9. 1958
10. Previous commercial service used, went out of business.
11. Commercial service and in-house facility were considered.

12-13.

<u>CRITERIA</u>	<u>RANK ORDER</u>
g) Quality control	1
a) Economic justification	2
e) Daily supply needs	3
i) Ease of system change	4
f) Amount of hospital control	5
d) Space needed for equipment	6

14. Samples of the linen are sent to a laboratory for cleanliness and tensile strength tests.

15. Yes. 1) Aversion to contracts keeps the hospital from using any commercial service which requires a contract to be signed.
- 2) Shared services were not considered, because it was felt that a small hospital such as this one would receive second rate service as opposed to a large hospital in the same organization.

- 16. None
- 17. Approximately 3 weeks
- 18. All points were covered.

APPENDIX III

DATA ANALYZATION

1. Administrative Control

- a) Should the hospital relinquish control of any of its functions?
- b) Should the hospital devote itself entirely to direct patient care only?
- c) Should the hospital use the laundry to demonstrate that it can work together with other hospitals to deliver more effective health care?

2. Facilities

- a) Is there equipment already available to do the necessary work in-house, or will a major capital outlay be necessary to purchase such equipment?
- b) Is the available equipment in good condition? Is it able to handle the required loads?
- c) Is the laundry area clean and well ventilated for a proper working atmosphere?
- d) Can the laundry handle an increase in the daily linen demands? If so, what size increase?
- e) Is there room available for any size of expansion of the facility as the linen demand increases?
- f) Are there other facilities nearby (commercial or shared services) which can handle the laundry work, or must it be done in-house?
- g) How easily can a new service be obtained if the hospital is dissatisfied with its present service?

3. Personnel

- a) Is the present laundry manager well versed in the operation of laundry equipment?
- b) Does he have the skill necessary to direct the employees in a cooperative effort?
- c) Does he stay abreast of the latest advances in laundry technology?
- d) If the present manager cannot meet these requirements, is there somebody available who can?

4. Cost

- a) In evaluating the various alternatives are all costs taken into consideration such as:

In-house Facility

- i. All steam, water, fuel and electric costs.
- ii. Building space (opportunity cost) and depreciation costs
- iii. All payroll costs including fringe benefits
- iv. All laundry supply costs
- v. All linen replacement costs
- vi. All equipment maintenance and repair costs.
- vii. The future increases of all costs

Commercial and shared services

- i. The base contract cost (Usually a per pound cost)
- ii. The cost involved with a larger inventory requirement than in-house needs.

iii. All linen replacement costs due to damage and pilferage.

iv. All payroll (including fringe benefits) costs of the employees involved in the sorting and distribution of linens

v. The future increases of these costs.

b) What is the length of commitment of the hospital to the service due to contracts, capital expenditures, etc.?

5. Quality

a) Are the standards of whiteness, tensile strength and cleanliness met by the service being considered?

b) Are fresh linen supplies delivered on time in spite of strikes, machine breakdowns, etc.?

c) If the inventory of any type of linen is used up before a new supply arrives, how easy is it to get an emergency supply of the needed item?

d) If for any reason the linen supply is not delivered, how easy is it to receive linens from another source for a short duration supply?

APPENDIX IV

Coefficient of Concordance Results

$$m(n+1)/2 = 6(6)/2 = 18$$

$$s_{\max} = m^2(n^3-n)/12 = 6^2(s^3-s)/12 = 360$$

$$\begin{aligned} s &= (18-17)^2 + (18-22)^2 + (18-27\frac{1}{2})^2 + (18-14)^2 - (18-9\frac{1}{2})^2 \\ &= 195.5 \end{aligned}$$

$$W = s/s_{\max} = 195.5/360 = .543$$

Test W for significance

Ho: The participants do not exhibit a notable degree of agreement as to what the rank order of importance of the decision areas should be.

$$W = S-1/S_{\max+2} = 195.5 + 1/360+2 = .537$$

$$F = (m-1)(w)/(1-W) = (6-1)(.537)/(1-.537) = 5.80$$

Greater Estimate of Degrees of Freedom

$$(n-1) - (2/m) = (5-1) - 2/6 = 3.67$$

Lesser Estimate of Degrees of Freedom

$$(m-1)[(n-1) - (2/m)] = (6-1)[(5-1) - 2/6] = 18.35$$

$$5\% \text{ level of } F = 3.0$$

$$1\% \text{ level of } F = 4.8$$

Calculated $F = 5.8$

Therefore, reject the null hypothesis and conclude that the participants agree on the rank ordering and do not do so strictly by chance.

VITA

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